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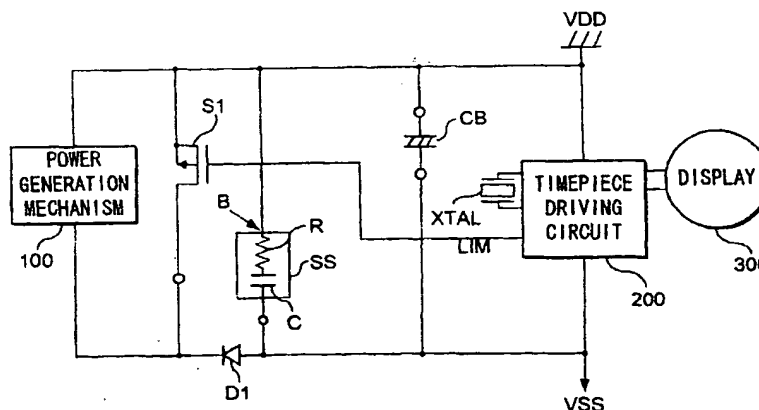
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(54) **Charging device for electronic timepiece, electronic timepiece, and method for controlling charging device**

(57) An electronic timepiece charging device for charging an electronic timepiece comprising: a generator for converting external energy into electric energy; a secondary power source for storing the electric energy generated by the generator; a timepiece driving circuit for performing a time-keeping operation; and a time display circuit for displaying time information from the timepiece driving circuit, wherein, the timepiece driving circuit is connected in parallel to the secondary power

source; and the secondary power source comprises an equivalent capacitive component for storing an electric charge and a resistive component formed by a part of the equivalent capacitive component. The resistance value of the resistive component is set to a value such that a voltage drop is caused, whereby when the generator generates a current equal to or greater than a predetermined value, a voltage to be applied to the timepiece driving circuit by the generator is equal to or greater than the lowest operation starting voltage.

FIG. 1



EP 1 098 235 A3



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## EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	HAYAKAWA M: "A STUDY OF THE NEW ENERGY SYSTEM FOR QUARTZ WATCHES (II) - THE EFFECTIVE CIRCUIT FOR THE SYSTEM" ACTE DU CONGRES, SOCIETE SUISSE DE CHRONOMETRIE, NEUCHATEL, CH, no. 1, 23 September 1988 (1988-09-23), pages 81-85, XP000035001	1-3	604C10/00 604G1/00
A	* page 84, left-hand column, paragraphs 1-3; figures 7,8,10 *	4-15	
Y	US 5 001 685 A (HAYAKAWA MOTOMU) 19 March 1991 (1991-03-19)	1-3	
A	* column 13, line 22 - column 15, line 20 *	4-15	
Y	EP 0 309 164 A (SEIKO EPSON CORP) 29 March 1989 (1989-03-29)	1-3	
	* column 9, line 21 - column 10, line 26 *		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			604C 604G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 10 January 2003	Examiner Exelmans, U
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 30 9063

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The members are as contained in the European Patent Office EDP file on  
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Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5001685	A	19-03-1991	WO	8906834 A1	27-07-1989
			CN	1035009 A ,B	23-08-1989
			DE	68905833 D1	13-05-1993
			DE	68905833 T3	06-02-1997
			EP	0326313 A2	02-08-1989
			HK	107897 A	22-08-1997
			KR	9406915 B1	29-07-1994
EP 0309164	A	29-03-1989	JP	1078188 A	23-03-1989
			JP	2537640 B2	25-09-1996
			JP	1078189 A	23-03-1989
			JP	2537641 B2	25-09-1996
			JP	1078190 A	23-03-1989
			JP	2537642 B2	25-09-1996
			CN	1032246 A ,B	05-04-1989
			DE	3850831 D1	01-09-1994
			DE	3850831 T2	10-11-1994
			DE	3855081 D1	11-04-1996
			DE	3855081 T2	18-07-1996
			EP	0309164 A2	29-03-1989
			EP	0510730 A2	28-10-1992
			HK	102497 A	15-08-1997
			KR	9305425 B1	21-06-1993
			US	4882717 A	21-11-1989

EPC FORM P/459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82